

REMARKS

Claims 12-26 were previously pending in the application. This Amendment amends claims 15 and 23 to provide proper antecedent basis. Claims 12-14, 16-22, and 24-26 remain unchanged.

Objection to the Claim for Priority

This Amendment amends the specification to include a specific reference to the prior-filed priority application in the first sentence of the specification following the title. Applicants respectfully request withdrawal of this objection.

Objections to the Oath or Declaration

This Amendment encloses a Substitute Declaration. Applicants respectfully request withdrawal of this objection.

Objections to the Specification

The Office Action objects to the specification under 35 U.S.C. § 132(a) because the Amendment under 37 C.F.R. § 1.111, which was filed on June 28, 2007, allegedly introduces new matter into the disclosure. Applicants respectfully traverse this objection.

Amendments to an application which are supported in the original description are not new matter. M.P.E.P. § 2163.07. By disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may later be amended to recite the function, theory or advantage without introducing prohibited new matter. M.P.E.P. § 2163.07(a).

Applicants respectfully submit that the Amendment under 37 C.F.R. § 1.111 does not introduce new matter into the disclosure of the invention because the new paragraph merely makes explicit, subject matter that was inherently disclosed in the application. In

particular, a person of ordinary skill in the art at the time of the invention, upon reading, for example, page 5, line 11 to page 7, line 16, of the specification would understand the subject matter of the new paragraph to be inherently disclosed.

That is, the ordinarily skilled artisan would appreciate from page 5, line 11 to page 7, line 16, of the specification that, by varying the pulse-duty ratio based on the supply voltage, the fixed heating interval can be set to a length of time such that the evaporator 7 will completely defrost at a supply voltage of 160 VAC, and such that the fixed time interval is sufficient to completely defrost the evaporator 7 at substantially any supply voltage without wasting excess energy. For example, at a supply voltage of 230 VAC, wherein the supply voltage is pulsed at a 55% pulse-duty ratio, as described at page 5, lines 26-34 of the specification, the resulting heat energy supplied to the defrost heater 8 will be equivalent to the heat energy supplied to the defrost heater 8 when the supply voltage is 160 VAC and the pulse-duty ratio is 100%. Accordingly, the fixed heating interval is sufficient to defrost the evaporator 7 when the supply voltage is 230 VAC.

For at least these reasons, the Amendment under 37 C.F.R. § 1.111 did not introduce new matter into the specification. Applicants respectfully request withdrawal of this objection.

If the objection under 35 U.S.C. § 132(a) is maintained in the next Office Action, Applicants respectfully request that the Office Action identify the specific features that are considered to be new matter.

Claim Rejections under 35 U.S.C. §112

The Office Action rejects claims 12-26 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite.

Claims 12 and 19:

The Office Action alleges that it is not definite to exactly what "keyed" is, and therefore, the recitation to "keyed accordingly" (sic) is deemed indefinite. Applicants respectfully traverse this rejection.

If the scope of the claimed subject matter can be determined by one having ordinary skill in the art, a rejection under 35 U.S.C. § 112, second paragraph, is not appropriate. M.P.E.P. § 706.03(d). The essential inquiry pertaining to the requirement under 35 U.S.C. § 112, second paragraph, is "whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of: (A) the content of the particular application disclosure; (B) the teachings of the prior art; and (C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. [...] a claim term that is not used or defined in the specification is not indefinite if the meaning of the claim term is discernible." M.P.E.P. § 2173.02.

First, Applicants respectfully submit that claims 12 and 19 do not recite "keyed accordingly" (sic) as alleged in the Office Action. Instead, claim 12 recites "*supplying said defroster heater with said pulsed supply current keyed according to said generated pulse-duty ratio, for a fixed heating interval*" (emphasis added). On the other hand, claim 19 recites "*a keyed control signal*."

Second, claims 12 and 19 are clear and definite because the ordinarily skilled artisan would know and understand the meaning of the phrases "*keyed according to said generated pulse-duty ratio*" as recited in claim 12, and "*a keyed control signal*" as recited in claim 19, in view of the specification and the ordinary meaning of the term "*keyed*."

The term "keyed" is defined as "to bring into harmony or conformity : make appropriate : attune <remarks keyed to a situation>" by Merriam-Webster's Online Dictionary, © 2007-2008 Merriam-Webster, Incorporated. The ordinary meaning of the term "keyed" is consistent with the explanation of the term "keyed" in the specification.

For example, the specification explains that, with conventional devices for defrosting evaporators in refrigeration devices, the defroster heating is unkeyed independently of the mains voltage, that is, switched on with a pulse-duty ratio of 100%. The subject application recognizes that the defrost heating being unkeyed can result in there being either too much or too little heat supplied wherein there are fluctuations in voltage, since the heat output varies in proportion to the square of the supply voltage of the defroster heating. If there is too little heat, the defrosting procedure is often incomplete, and if there is too much heat this is associated with unnecessary energy consumption. The specification further explains that, by keying the defroster heating depending on the supply voltage, these problems may be avoided, in that the relative duty cycle of the defroster heating decreases with rising supply voltage. (Page 3, lines 11-25; page 4, lines 10-18; page 8, lines 15-26).

For at least these reasons, claims 12 and 19 are clear and definite, and the ordinarily skilled artisan would know and understand the meaning of the phrases “*keyed according to said generated pulse-duty ratio*” as recited in claim 12, and “*a keyed control signal*” as recited in claim 19. Applicants respectfully request withdrawal of this rejection.

Claims 15 and 23:

This Amendment amends Claims 15 and 23 to provide proper antecedent basis. Applicants respectfully request withdrawal of this rejection.

The Claimed Invention

The specification explains that in refrigeration devices, such as refrigerators, ice may form on the frigorific evaporator. This ice has an insulating effect, so that exchange of cold between the evaporator and the cooling chamber is made difficult. For this reason, the ice must be thawed from time to time, for which purpose many refrigeration appliances, in particular so-called frost-free appliances, have defroster heating. (Page 1, lines 10-17).

Conventionally, such defroster heating is controlled, for example, by ice sensors such that the defrosting process is performed if a recorded quantity of ice exceeds a limit value, and discontinued if no more ice is detected. However, such ice sensors may be expensive and insufficiently reliable. Also, a large number of ice sensors may be necessary to reliably assess the total quantity of ice since the thickness of the ice can vary from place to place. Some conventional devices periodically control defrosting procedures with a fixed preset duration with the assistance of a time switch element, which generally is easy, cost-effective, and reliable. (Page 1, lines 19-31-26).

However, the specification recognizes that: (1) the time actually required for defrosting a given quantity of ice depends on the performance of the defroster heating and thus on the value of the supply voltage of the defroster heater, and (2) the supply voltage provided by the external supply mains is not necessarily identical to a specified nominal voltage at that place of the mains, rather the supply voltage may vary from place to place and time to time within a specified width of fluctuation by the nominal voltage. (Page 1, lines 31-36, and page 2, lines 1-3).

To solve the aforementioned problems, independent claim 12 recites a method for operating a defroster heater of a refrigeration device, which includes: *“a) recording a voltage value of a supply voltage for the defroster heater; b) generating a pulse-duty ratio for a pulsed supply current for said defroster heater depending on said recorded voltage value; and c) supplying said defroster heater with said pulsed supply current keyed according to said generated pulse-duty ratio, for a fixed heating interval.”*

Independent Claim 19 recites a refrigeration device, which includes: *“[(a)] a recording circuit coupled to said voltage supply for recording a voltage value supplied to said defroster heater; [(b)] said recording circuit generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value; and [(c)] a circuit breaker activated by said control signal for pulsing a supply current fed to said defroster heater for a fixed heating interval.”*

By keying the defroster heating depending on the supply voltage, the aforementioned problems may be avoided, in that the relative duty cycle of the defroster heating decreases with rising supply voltage. (Page 3, lines 11-25).

The Alsenz Reference

The Office Action rejects claims 12-14, 18-21, and 26 under 35 U.S.C. § 102(b) as allegedly being anticipated by the Alsenz reference (U.S. Pat. No. 4,531,376). Applicants respectfully traverse these rejections.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. [...] The identical invention must be shown in as complete detail as is contained in the ... claim." M.P.E.P. § 2131.

Applicants respectfully submit that each and every element of the claims is not expressly or inherently described in the Alsenz reference. In particular, the Alsenz reference does not teach or suggest the features of the claimed invention including (a) recording a voltage value of a supply voltage for the defroster heater, (b) generating a pulse-duty ratio for a pulsed supply current for the defroster heater depending on the recorded voltage value, and (c) supplying the defroster heater with the pulsed supply current keyed according to the generated pulse-duty ratio, for a fixed heating interval, or for that matter, devices for performing these features.

First, the Office Action alleges that the Alsenz reference discloses a defroster heater (heating element 46) of the refrigeration device. Applicants respectfully submit that, contrary to the Office Action, the heating element 46 is not a defroster heater because the heating element 46 does not defrost the evaporator coil 14. Instead, the Alsenz reference discloses an evaporator defrost means 26 that defrosts the evaporator coil 14 when the accumulation of ice or frost needs to be removed from the evaporator surface to increase the heat exchange efficiency of the evaporator. (Col. 5, lines 1-5).

In contrast to the claimed invention, the heating element 46 of the Alsenz reference is part of the defrost termination control 28, as shown in Fig. 2. Specifically,

the defrost termination control 28 includes a thermostatic switch 40, the heating element 46, and an optical frost sensing and initiation means 48. The thermostatic switch 40 has a pair of thermostatically controlled switch contacts 42, 44 positioned adjacent the evaporator coil 14 and responsive to the temperature of the coil 14. The heating element 46 is positioned in a heat transfer relationship to the thermostatic switch 40 to maintain the temperature of the thermostatic switch 40 above a predetermined "low" temperature level, such that the refrigerator compressor 18 is energized. (Abstract; Fig. 2; and col. 5, lines 55-62).

In operation, the optical frost sensing and initiation means 48 de-energizes the heating element 46 when defrost is necessary, permitting the thermostatic switch 40 to cool below the "low" temperature level and to de-energize the compressor 18 and actuate the defrost means 26 to defrost the evaporator coil 14. The defrost means 26 heats the evaporator coil 14 until the melting point of the frost or ice is reached to remove frost and ice, and also heats the thermostatic switch 40. The state of the thermostatic switch 40 is changed when the thermostatic switch 40 is heated to a predetermined "high" temperature level, which results in re-energizing the compressor 18 to cool the evaporator coil 14, de-energizing the defrost means 26, and re-energizing of the heating element 46. The re-energized heating element 46 again maintains the temperature of the thermostatic switch 40 above the "low" temperature. (Abstract).

In stark contrast to the claimed invention, when the heating element 46 is energized, the defrost means 26 for defrosting the evaporator coil 14 is de-energized. When the heating element 46 is de-energized, the defrost means 26 is energized for defrosting evaporator 14. (Col. 6, lines 1-28). The heating element 46 is not a defroster heater because the heating element 46 does not defrost the evaporator coil 14.

Second, the Office Action alleges that the features of the claimed invention are disclosed by the Alsenz reference at the Abstract, and col. 8, line 18, to col. 9, line 10; page 13, claim 9; and page 15, claims 22-28.

In contrast to the Office Action, Applicants respectfully submit that the Alsenz reference is completely silent with respect to (a) recording a voltage value of a supply

voltage for the defroster heater, (b) generating a pulse-duty ratio for a pulsed supply current for the defroster heater depending on the recorded voltage value, and (c) supplying the defroster heater with the pulsed supply current keyed according to the generated pulse-duty ratio, for a fixed heating interval, or for that matter, devices for performing these features, as recited in independent claims 12 and 19.

The cited portions of the Alsenz reference merely explain the operation of the optical frost sensing and initiation means 48, as shown in Fig. 4 (Col. 7, lines 31-59), not the defrost means 26. Applicants respectfully submit that the optical frost sensing and initiation means 48 merely is a conventional optical ice sensor, which is similar to the conventional optical ice sensor explained in the specification. (Page 1, lines 19-26).

In particular, the Alsenz reference discloses that, in operation, an LED 70 is "turned on" at regular intervals determined by the RC time constant of resistor 66 and capacitor 75 acting as a pulse circuit means, and the LED 70 generates successive pulses or bursts of electromagnetic radiation directed toward the LASCR (light activated silicon controlled rectifier) 49, (Col. 8, lines 18-31). As long as the LASCR 49 receives sufficient electromagnetic radiation from LED 70, the LASCR 49 acts as a switch means to energize the heating element 46 in successive bursts corresponding to the LED 70 pulses. Such bursts of the heating element 46 cause thermal heating sufficient to maintain the thermostatic switch 40 above the "low" temperature mode to continue the operation of the compressor 18 to cool the refrigerated space. (Col. 8, lines 42-64). Thus, if there is no ice or frost on coil 14, or if the ice or frost thickness on coil 14 is insufficient to scatter or absorb all of the pulses of electro-magnetic radiation generated by the LED 70, then the LASCR 49 pulses the heating element 46 to maintain the thermostatic switch 40 above the "low" temperature mode.

When insufficient electromagnetic radiation reaches LASCR 49, the heating element 46 is de-energized such that the thermostatic switch 40 cools rapidly to its "low" temperature mode, and closes switch contacts 44 to energize the defrost means 26 for defrosting the coil 14. (Col. 8, lines 65-68, and col. 9, lines 1-7). During the "defrost" mode, the defrost means 26 heats the coil 14 until the thermostatic switch 40, which is

responsive to the temperature of the coil 14, detects that the temperature of coil 14 reaches a preset temperature. At this time, the thermostatic switch 40 causes the compressor 18 to restart. (Col. 6, lines 28-52). That is, once the defrost means 26 is turned on, the thermostatic switch 40 controls when the defrost means 26 is turned off.

Applicants respectfully submit that, aside from merely describing that the defrost means 26 is energized to defrost the coil 14, the Alsenz reference is completely silent with respect to the supply voltage of the defrost means 26. In particular, the Alsenz reference is completely silent with respect to (a) recording a voltage value of a supply voltage for the defroster heater, (b) generating a pulse-duty ratio for a pulsed supply current for the defroster heater depending on the recorded voltage value, and (c) supplying the defroster heater with the pulsed supply current keyed according to the generated pulse-duty ratio, for a fixed heating interval, or for that matter, devices for performing these features, as recited in independent claims 12 and 19.

For these and other reasons, the Alsenz reference does not disclose or suggest the subject matter defined by independent claims 12 and 19. Claims 13-18 and 20-26 depend from claims 12 and 19, respectively, and are allowable for the same reasons and also because they recite additional patentable subject matter. Applicants respectfully request withdrawal of this rejection.

The Alsenz Reference in view of Legal Precedent

The Office Action rejects claims 15-17 and 22-25 under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Alsenz reference in view of legal precedent. Applicants respectfully traverse this rejection.

The Office Action acknowledges that the Alsenz reference fails to disclose the features recited in claims 15-17 and 22-25, but relies on legal precedent to make up for these acknowledged deficiencies.

A claim is rendered obvious if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the

art to which said subject matter pertains. M.P.E.P. § 2141. If the applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to rely solely on case law as the rationale to support an obviousness rejection. MPEP § 2144.04.

Applicants respectfully submit that one of ordinary skill in the art would not have been motivated to modify the Alsenz reference in the manner alleged in the Office Action. Indeed, the Alsenz reference is completely silent with respect to (a) recording a voltage value of a supply voltage for the defroster heater, (b) generating a pulse-duty ratio for a pulsed supply current for the defroster heater depending on the recorded voltage value, and (c) supplying the defroster heater with the pulsed supply current keyed according to the generated pulse-duty ratio, for a fixed heating interval, or for that matter, devices for performing these features, as recited in independent claims 12 and 19.

Moreover, Applicants respectfully submit that it is not appropriate to rely solely on case law as the rationale to support the obviousness rejection of claims 15-17 and 22-25.

The specification demonstrates the criticality of the features recited in claims 15-17 and 22-25. (Page 3, line 27, to page 4, line 18; page 5, lines 19-34; and page 6, line 24 to page 8, line 26). Thus, it is not appropriate to rely solely on case law as the rationale to support such an obviousness rejection of these claims.

For these and other reasons, the Alsenz reference does not disclose or suggest the subject matter defined by claims 15-17 and 22-25. Applicants respectfully request withdrawal of this rejection.

CONCLUSION

In view of the above, entry of the present Amendment and allowance of Claims 12-26 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

Respectfully submitted,



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